August 10, 1999
[NOTE: This has a 30-day comment period]

LAKE OKEECHOBEE WATER RETENTION/PHOSPHORUS REMOVAL

CRITICAL PROJECT

OKEECHOBEE COUNTY, FLORIDA

PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the Environmental Assessment (EA) for the proposed project. This finding incorporates by reference all discussions and conclusions contained in the Environmental Assessment for Lake Okeechobee Water Retention/Phosphorus Removal Critical Project. Based on the information analyzed in the Environmental Assessment and pertinent data obtained from federal agencies having jurisdiction by law and/or special expertise, and information obtained from the interested public, I conclude that the considered action would have no significant impact on the quality of the environment. Reasons for this conclusion are:

a. There would be no adverse impacts to endangered or threatened species. Measures to protect the eastern indigo snakes and Audubon's crested caracara will be incorporated into the plans and specifications for the project.

b. Measures to eliminate, reduce, or avoid potential adverse impacts to fish and wildlife resources would be implemented, including, 1) operation and maintenance of the project to further the goals of ecosystem restoration; 2) measures to avoid the spread or release of contaminants, petroleum products, or other harmful substances during construction, 3) State concurrence with the Coastal Zone Consistency Statement, and; 4) afford the State Historic Preservation Officer a reasonable opportunity to comment concerning any eligible historic resources.

c. State water quality requirements would be followed.

d. Pending completion of consultation with the State Historic Preservation Officer, sites of cultural or historical significance will not be affected.

e. This is a Critical Restoration Project authorized by Section 528 of the Water Resources Development Act of 1996, which provides net benefits to the Everglades ecosystem through water quality improvements to the Lake Okeechobee watershed.

In consideration of the above-summarized information, I find that the considered action does not require preparation of an Environmental Impact Statement.

Date_____

JOE R. MILLER
Colonel, U.S. Army
District Engineer

TABLE OF CONTENTS

LIST OF FIGURES

SUMMARY

The Lake Okeechobee Water Retention and Phosphorus Removal project is a Central and Southern Florida Ecosystem Restoration Critical Project. The Critical Projects were authorized by Section 528 of the Water Resources Development Act of 1996 to "develop specific water quality related project features which are essential to Everglades restoration" and those projects that are "determined by the Secretary to be critical to the restoration of the Everglades." Key elements of the Critical Projects were that they produce independent, immediate, and substantial restoration, preservation, and protection benefits; must be consistent with the elements of the Governor's Commission's Conceptual Plan; could be initiated by execution of the PCA, prior to September 30, 1999; the total cost estimate for a single project must be less than $50 million ($25 million Federal share); and that the project cannot be an authorized component of the Central and Southern Florida Project. The initial list of projects were evaluated and prioritized by the South Florida Ecosystem Restoration Working Group (Working Group), a subgroup of the Interagency Task Force which is made up of Federal, State, and Tribal representatives. Criteria used to prioritize the list included: level of estimated benefits, land acquisition is acceptable, whether the project offers a significant benefit (cost savings or ecosystem benefit) from early implementation, and level of visible results and benefits. The U.S. Army Corps of Engineers, Jacksonville District (Corps) then evaluated each project and prepared letter reports based on the priorities recommended by the Working Group. The Working Group recommended 34 projects from the original list of 80 potential projects. The Lake Okeechobee Water Retention and Phosphorus Removal project was ranked 10th out of those 34 projects.

A letter report was prepared based on existing data (Appendix E). The letter report was signed by the District Engineer and approved by Corps Headquarters in March 1998. As stated in the letter report, the purpose of the Lake Okeechobee Water Retention and Phosphorus Removal project is to reduce phosphorus loads draining into Lake Okeechobee and the Lake Okeechobee watershed and to increase regional water storage. There are two elements within this project designed to reduce the phosphorus loads and increase water retention and storage as well as restore wetland habitat within the area. One approach will be to restore hydrology of isolated wetlands with methods such as plugging connection ditches. This approach will be designed and constructed by the South Florida Water Management District (SFWMD) on the ten additional sites proposed as part of the overall project. The SFWMD currently has a Nationwide

Permit Number 27 (Wetland Restoration Activities) under the Regulatory Program of the Corps to do this work. The issuance of this permit satisfies the necessary requirements of the National Environmental Policy Act; therefore this approach will only be referenced in this document. The second approach consists of the construction of two Stormwater Treatment Areas (STAs). One STA will be constructed at what is currently the New Palm Dairy, adjacent to Nubbin Slough. The other STA will be constructed at Grassy Island, where cattle are currently being raised, adjacent to Taylor Creek. These areas were selected because of their prime location north of Lake Okeechobee. The intent of this project is to reduce phosphorus levels entering the Lake and increase the ability of water storage and retention. The creation of the STAs is expected to improve the water quality of those areas, which will in turn, improve the water quality of waters entering Lake Okeechobee by way of Nubbin Slough and Taylor Creek. Water storage and retention may improve lake stages by reducing the rise in lake stages during heavy rainfall periods and a slower drop in lake stages during droughts according to the proportionate flow that is produced by these STAs and their contributing water bodies.

LAKE OKEECHOBEE WATER RETENTION/PHOSPHORUS REMOVAL

CRITICAL PROJECT

ENVIRONMENTAL ASSESSMENT

1.0 PROJECT PURPOSE AND NEED

1.1 Document Authority. This Environmental Assessment (EA) has been prepared to comply with the National Environmental Policy Act (NEPA).

1.2 Project Authorization. This project is one of the Critical Restoration Projects authorized by Section 528 of the Water Resources Development Act of 1996. A list of Critical Projects was proposed and then prioritized and ranked by the South Florida Ecosystem Restoration Working Group through a process allowing input from the Governor's Commission for a Sustainable South Florida and the public. The Lake Okeechobee Water Retention and Phosphorus Removal Project was ranked 10th on the list of Critical Projects. The sponsor for the project is the South Florida Water Management District (SFWMD).

1.3 Project Location. Okeechobee County is in south central Florida, just north of Lake Okeechobee. The two Stormwater Treatment Areas (STAs) proposed as part of this project are located within the Taylor Creek-Nubbin Slough watershed basin and would be designed and constructed by the U.S. Army Corps of Engineers, Jacksonville District (Corps) and their Contractors (Figure 1). The sponsor will purchase the land needed for construction. The proposed New Palm site is located on the New Palm Dairy adjacent to Nubbin Slough. The proposed Grassy Island site is located on the Grassy Island Ranch adjacent to Taylor Creek. The additional ten project sites that are being proposed as part of this project are located within Okeechobee and Highlands County on private lands. The ten sites involve projects for wetland restoration and/or water retention. Those sites will be mentioned in this Environmental Assessment (EA) since they are part of the overall project, however those sites will be designed and constructed by the sponsor. The ten sites have undergone NEPA via a Department of the Army Regulatory permit under the Nationwide Permit Program (Nationwide Permit Number 27, Wetland Restoration Activities).

[Figure 1]

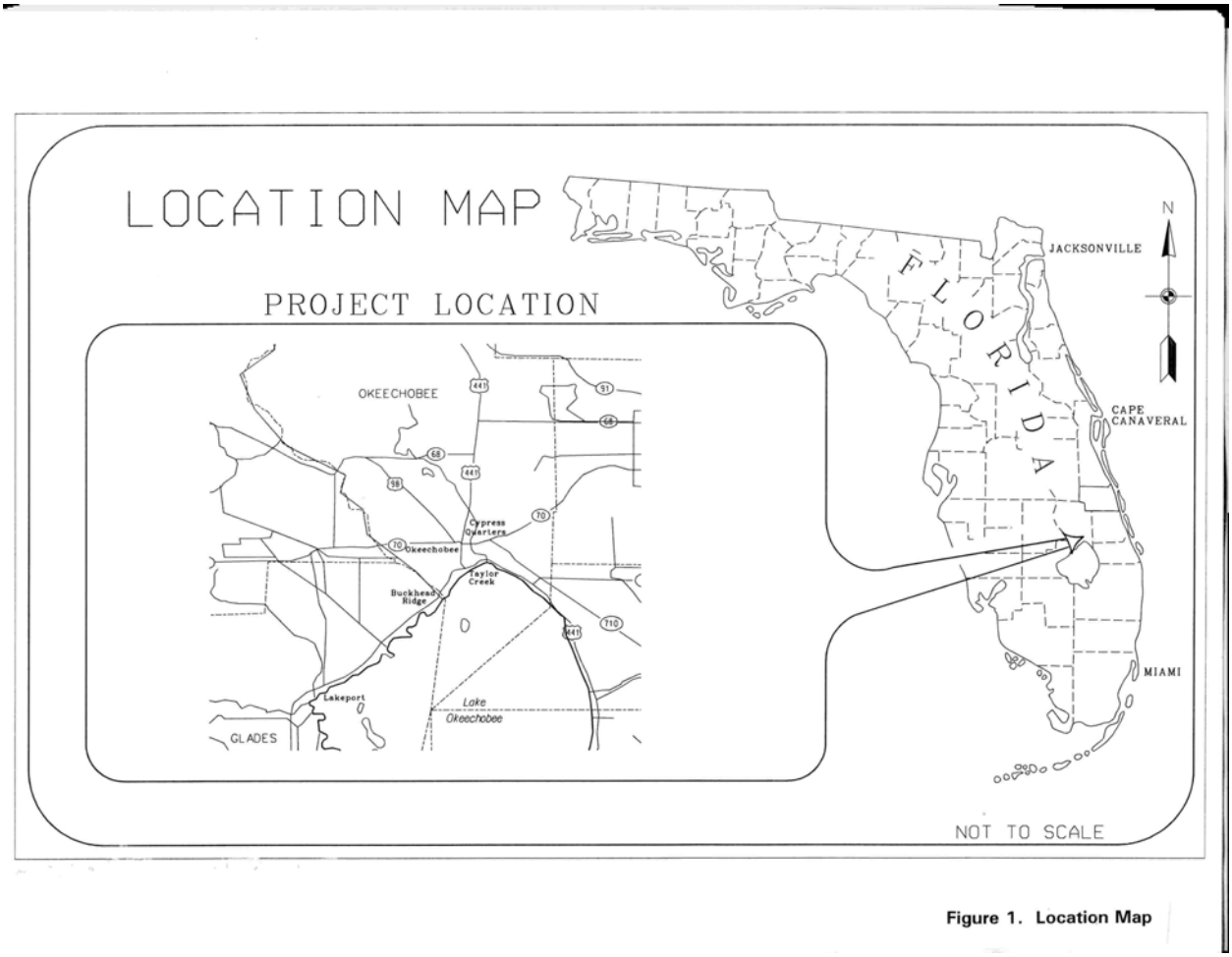

Figure 1. Location Map

1.4 Description of Proposed Action. The proposed alternative consists of constructing two STAs designed to retain and store basin flow and improve on-site water quality as well as water quality downstream at Lake Okeechobee. One of the two STAs will be located at Nubbin Slough. This plan utilized 1,077 acres of the 2,135-acre Nubbin Slough site and provides 1,072 acres of water surface area for effective treatment. This planned STA will be divided into two cells to make use of the existing topography for optimal treatment. Water will be pumped from Nubbin Slough by force main to the upstream end of the STA. Flow will then continue from the first cell into the second cell by gravity flow and back into Nubbin Slough. The rate that water will be pumped will be dependent upon available water supply in the Slough (Figure 2). The second STA will be located at Taylor Creek on Grassy Island Ranch. This plan utilized approximately 170 acres of the 200-acre Taylor Creek site and provides approximately 169 acres of water surface area for effective treatment. This STA will also have two cells. Water will be pumped directly from Taylor Creek into the upstream end of the STA. Flow will then continue from cell 1 to cell 2 according to gravity (figure 3). The available flows in Taylor Creek significantly exceed the capacity of the site to treat flow. The flow rate in the system will be principally controlled by the pumping rate although the actual outflow rates will also depend on the incidence of rainfall, evapotranspiration and seepage. Specific project features are discussed in sections 2.2.5 and 2.3.5, respectively.

[Figure 2]

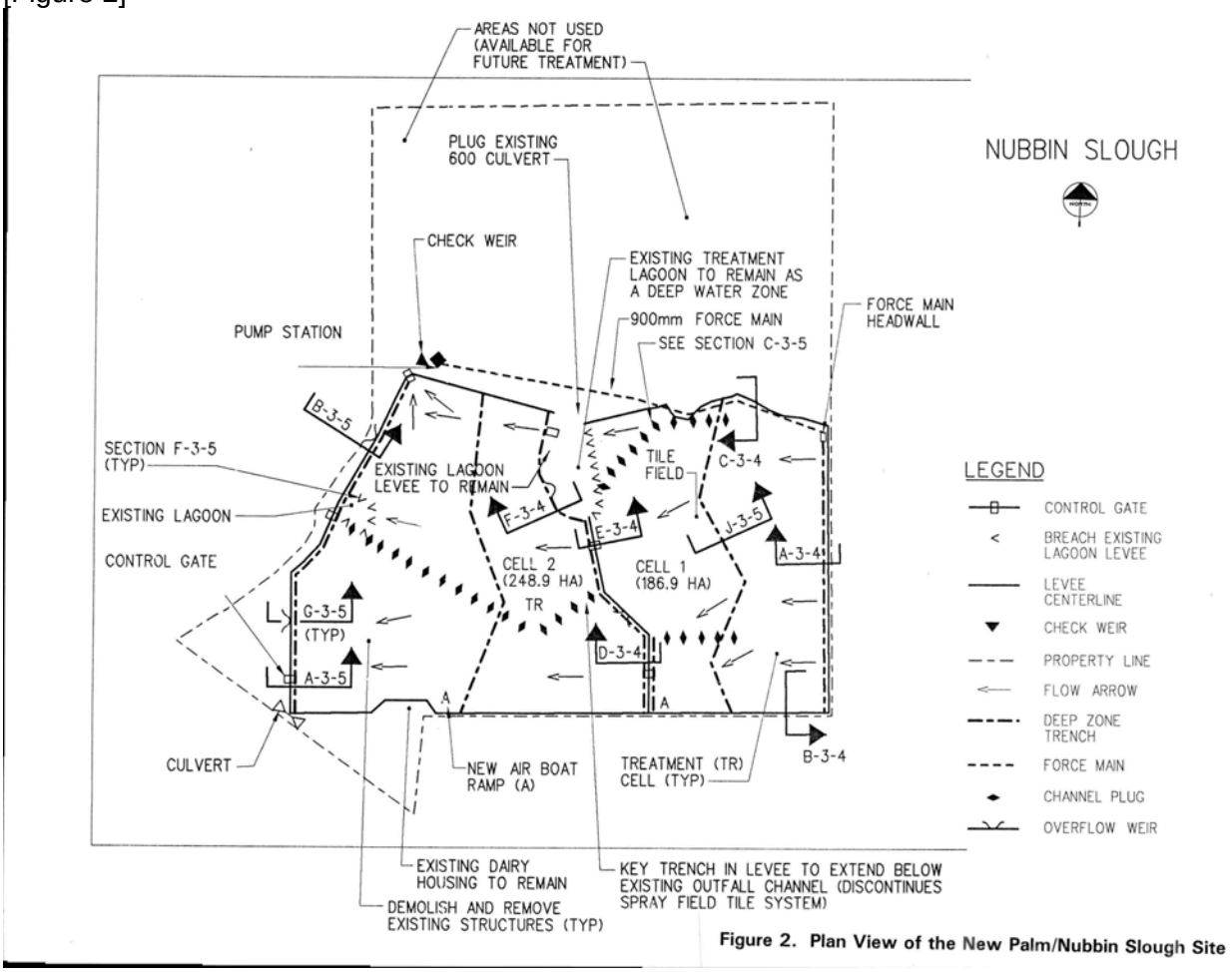

Figure 2. Plan View of the New Palm/Nubbin Slough Site

[Figure 3]

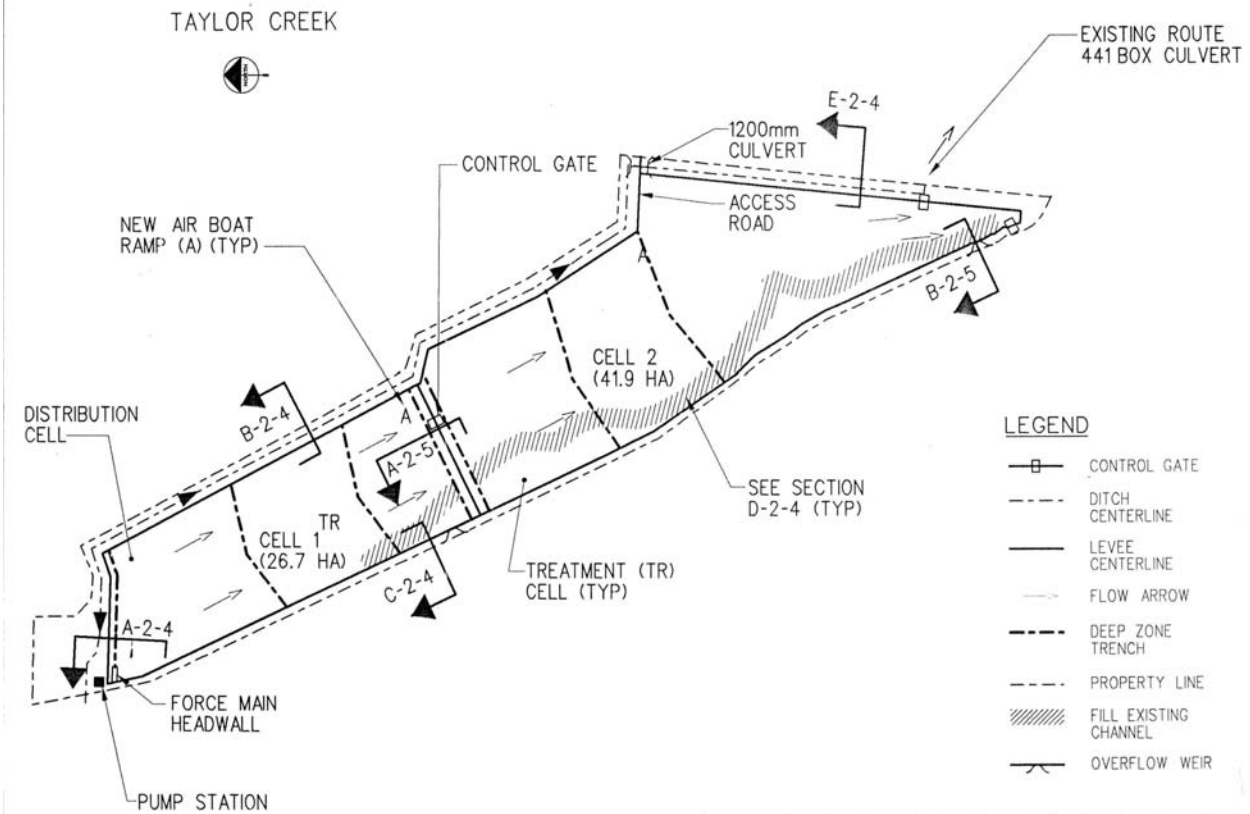

Figure 3. Plan View of the Grassy Island/Taylor Creek Site

1.5 Need for Proposed Action. Human activities, such as manipulation of water through ditching and draining, agriculture, and activities leading to nutrient rich urban stormwater runoff have caused the elevation of nutrients within south Florida over the years. As waters flow from north to south, phosphorus tends to decrease in concentration due to nutrient removal by wetlands. Wetland areas provide a natural water quality treatment process. According to the Florida Surface Water Improvement and Management (SWIM) Act Plan for Lake Okeechobee (SFWMD, 1997f), the highest average phosphorus concentrations (up to over 700 parts per billion (ppb) are measured in waters discharged from the Lower Kissimmee River (S-65D Basin = 770 ppb), Taylor Creek/Nubbin Slough (S-154 Basin = 610 ppb), and the Everglades Agricultural Area (East Beach Drainage District = 560 ppb). As stated in the Central And Southern Florida Project Comprehensive Review Study, Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (1999), the elevated phosphorus levels may cause negative effects to the lake ecosystem including the increase in primary productivity, the loss of water column dissolved oxygen, algal blooms, changes in vegetation and biodiversity, and accumulation of phosphorus in sediments and muck (USACE 1999). To prevent and reduce these negative effects, phosphorus levels of waters entering the Lake must be reduced. The purpose of this project is to decrease phosphorus from the surface runoff of these sites and ultimately to improve water quality returning from these sites back to Nubbin Slough and Taylor Creek and subsequently to Lake Okeechobee.

1.6 Permits. The Corps will submit an application for Water Quality Certification (WQC) to the Florida Department of Environmental Protection for the construction of the STAs. Project construction, to be accomplished by the Corps or their contractor, will not commence until the WQC has been received.

2.0 ALTERNATIVES

The alternatives section is the heart of this EA. This section describes in detail the no-action alternative, the proposed action, and other reasonable alternatives. Then based on the information and analysis presented in the sections on the Affected Environment and the probable impacts, this section presents the beneficial and adverse environmental effects of all alternatives in comparative form, providing a clear basis for choice among the options for the decision maker and the public.

Each site was considered separately. Stanley Consultants, Inc. (Contractor) was hired to develop alternatives for these two sites. Five alternatives were considered for each site and are listed below along with the no action alternative. The alternatives considered include:

2.1 No Action. The no action alternative is always a consideration in plan formulation. In this case, the no action plan was evaluated for each of the sites, but since the objective of the project is to improve the quality, timing, and delivery of waters entering Lake Okeechobee, it has been concluded that this alternative would be unacceptable to sustain a healthy aquatic ecosystem. At current rates of phosphorus introduction, the quality of water entering the lake and within the lake are unacceptable. The only way to improve this condition is to reduce phosphorus loading to the Lake from typically high phosphorus concentration areas, such as Nubbin Slough and Taylor Creek. This alternative does not meet the planning objectives.

2.2 Alternatives for the New Palm/Nubbin Slough Site. Alternatives will be referred to as they are identified in the Contractor's report, N-1 through N-5. All alternatives consider different design elements for the STA. For all alternatives planting of native vegetation will not be a feature of the projects, since a seed source exists for historical vegetation. In general, the existing tree lines form the limit of area available for treatment purposes for this site and will be preserved to the greatest possible extent. In addition, local runoff from the properties outside of the project site will be collected in swales/ditches immediately adjacent to the outside face of the perimeter levee. Alternative N-1 includes elements that will also be incorporated into the other alternatives, but they are only mentioned in detail within Alternative N-1.

Because the high intensity areas in the New Palm dairy may be a source of phosphorus in the effluent during the initial period of the STA operation, a phased approach may take place for this site. Removing the cattle from the site will result in a net reduction of approximately 20 to 25 tons of annual phosphorus deposition on this site. To ensure that the soils can reduce the remaining high intensity phosphorus concentrations, this site may undergo a phased approach: (1) perform a water quality synoptic survey on the entire site to determine the high phosphorus source areas in surface water runoff; (2) perform a soils analysis within existing high intensity areas and within the surrounding areas that are identified as high phosphorus source areas in the water quality surveys; and (3) assemble a panel of experts to advise of alternative phosphorus removal strategies that would assist in the development of a pre-STA management plan. Some types of land management strategies that may apply include: discontinue all on site phosphorus fertilization, develop an intensive hay-harvesting program to mine phosphorus from pastures and high intensity areas, chemical amendments to reduce phosphorus in dairy soils

based on uses at other sites, plug outfall of drainage ditches to eliminate poor water quality runoff, and plug outfall of drained wetlands to restore natural hydrology of the wetlands. Secondary management strategies could include low density cattle grazing, excluding cattle from all waterways, fill drainage ditches to encourage natural sheet flow, fill cooling ponds that have accumulated years of manure input, remove sediments from phosphorus saturated areas, prescribed burns to eliminate exotics that will likely proliferate once cattle are removed from the site, roller chop pastures to spread manure, and/or roller chop wetlands to encourage growth of native grasses. These practices will only be considered if it is determined that implementing the STA in a non-phased approach will be more detrimental; ie. if the presence of high intensity areas in the site can seriously hamper the capacity of the soils to reduce phosphorus from runoff.

2.2.1 Alternative N-1**.** This alternative would split the STA into treatment cells. Flows would be intercepted from the north, main and east branches of Nubbin Slough as they enter the project site and would be pumped into these separate cells. The treated water would then return to the main channel of Nubbin Slough for discharge from the site. During periods when the flow rate is less than the maximum value, the treatment facility would increase flow detention periods. An additional treatment cell would be constructed in the southwest corner of the project area to accommodate runoff from the south branch and to further treat east branch water. This cell would detain local runoff at the levee along the east bank of the lower reach of Nubbin Creek. This entire cell would operate by gravity and no pumping would be necessary. All cells would be designed for the maximum average monthly flow rate and each pump station would have the capacity to pump in the range of minimum to maximum monthly average flow rates. The pumps would discharge to distribution header channels incorporated into the perimeter levees. The distribution header channels are designed to supply flow to distribution structures located at 100 to 150 m intervals along the channel lengths. The distribution (ungated weir) structures consist of small box spreader weirs mounted into the levee crest section. The flow distribution structures would discharge into buffer/sedimentation cells at the upstream end of the treatment cell train. The pump header distribution structures would discharge into the STA cells. The cells are defined by the main perimeter levees and interior cell separation levees. The purpose of a cell separation levee is to regulate flow throughout the cell by controlling water depth, discharge rate and flow distribution. Additional gate structures would be provided in each of the separation levees and at the downstream end of the main perimeter levees for the purpose of de-watering the treatment cells. There would be no grading within any of the cells beyond that required for construction of the levees or incidental to other construction activities. Disadvantages of this plan would be that the plan requires three pump stations and there is a lack of water storage, which does not allow full development of the site as a STA treatment wetland.

2.2.2 Alternative N-2**.** The arrangement and operation of this alternative closely resembles alternative N-1. Both alternatives will have the same features in perimeter levees, check weirs, flow distribution structures, separation levees, drawdown structures, grading (other than the storage cells), treatment cell sealing, plantings (seeding levees for erosion protection), outlet structures, existing forest protection, and perimeter drainage. Features that vary from alternative N-1 include the storage cells which replace the buffer/sedimentation cells, the inflow structures that deliver the diverted stream flow to the storage cells by gravity, and the pumping of the average flow rates. The primary difference between the two alternatives lies in the extraction and pumping of flow from the north, main and east branches of Nubbin Creek. This alternative's objective is to provide gravity feed off of channel storage for flow equalization in the pumps (versus N-1 which pumped whatever flow was in the channel at the rate of flow in the range of the minimum to maximum average monthly flow rates). This would require the construction of storage cells. The floor and side slopes of the basin would be sealed. This alternative does not

fully take advantage of the entire site and the storage cells require extensive excavation. In addition, this plan does not isolate the land above the 30-foot contour in the southern portion of the site so there would be non-uniform flow and significant short-circuiting across this portion of the site.

2.2.3 Alternative N-3**.** In this scenario, the three branch pump stations would be consolidated into a single facility intercepting flow immediately downstream from the confluence of the main and east branches. Flow will be treated in a series of cells occupying the half of the site south of the main/east branch of Nubbin Slough. These will be the only treatment areas utilized other than the local runoff from the south branch which will be treated as with N-1 and N-2 and will be rolled into the larger series of cells. As with N-1, the pump station would be designed to pump in the range of the combined minimum to maximum average monthly flow rates for the north, main and east branches. For this alternative, one large pump station would be required and would have the capacity to pump in the range of the combined north, main and east branch minimum to maximum monthly average flow rate. In addition to the separation levee/distribution box combinations that detain flow in the treatment cells and distribute flow across those cells, a central dividing separation levee would be provided. This would create two separate treatment process trains so that one could be taken out of service for maintenance or other reasons while the second would remain in operation. This alternative would allow more effective use of the land, however the land developed for use as an STA still exceeds the available flow.

2.2.4 Alternative N-4**.** This alternative takes advantage of the full available treatment area of the site. The concept for this alternative is similar to N-3 with the consolidation of the tributary branch pump stations into a single facility intercepting flow immediately downstream from the confluence of the main and east branches. With this option, all flow from the north, east and main branches of the Slough upstream from the interception point would be collected at this point and pumped by a second force main north to the upstream end of the north branch treatment area. For this alternative it is proposed to construct a culvert from the L-63 Canal on the opposite side of State Route 710 from the project site, under State Route 710 to a second pump station adjacent to the highway. The culvert would operate by gravity flow. The imported water would then be distributed, by pump to the treatment cells in the southern portion of the site. Use of this water would allow full utilization of the area for STA treatment purposes. However, this alternative would greatly increase the cost from the additional pumping required.

2.2.5 Alternative N-5/Preferred Alternative**.** This alternative is the proposed alternative due to its phosphorus removal cost rate. Although N-4 removes more phosphorus, its costs greatly exceed that of alternative N-5. With implementation of N-5, elements of N-4 could be added in the future if funds become available. Alternative N-5 consists of one large treatment area split to provide greater efficiency in the treatment of phosphorus. Alternative N-5 has a central dividing separation levee, which creates two independent trains to provide flexibility in operation. The two cells will match the existing topography. This alternative is identical to N-3, except for the removal of the cattail planting strips, which was eventually removed from all alternatives, and replacement of the buffer cell with a distribution cell fed by the direct discharge of pumped flow via a splitter box. A header channel and associated distribution weirs were eliminated. Since it is a fairly large treatment area, two parallel treatment trains are proposed. The splitter box will control and proportion flow between the trains as needed.

Flow will be diverted from the Slough immediately downstream from the confluence between the main, north and east branches. Water is then pumped from the diversion by force main to the upstream end of the project facilities. The force main from the pump station on Nubbin Slough

will discharge directly into the splitter box. Flow then will cascade by gravity through Cell 1 to Cell 2 to the outfalls back into Nubbin Slough. Three outlet structures would be located along Nubbin Slough, one immediately downstream from the diversion weir point so flow is returned to the stream immediately downstream of the weir. This will maintain some water in the entire project reach of the Slough. The pool level in both of the cells will be maintained by gate structures featuring downward opening sluice gates. A low head check weir will be constructed across the Nubbin Slough channel bottom immediately downstream from the confluence of the main, north and east branches of the slough for the purpose of diverting flow into the pumps. Flood flows in excess of the maximum pumping rate will overtop the weir and continue downstream via the original watercourse, which will be left in place. The weir structure will be designed to maintain any rise, as a result of the weir obstruction, to an acceptable level. The check weir will raise the water surface in the Slough to approximately 2.5 feet. The weir will be constructed as an inverted "T" section concrete wall, imbedded into the stream bed and stream bank. Influent water for the treatment process will be pumped from Nubbin Slough at the rate available.

The pump station will consist of four submersible pumps, three pumps will accommodate the maximum monthly average flow with the fourth on standby. The intake will be placed upstream of the check weir and will consist of three 4-foot culverts. The culvert headwall will incorporate the provision for stop log slots to isolate the pump station during major maintenance events and a floating trash barrier. It is anticipated that the pump station will operate continuously with the number of pumps on line at any time being a function of the available water. The station will be unmanned and remotely operated. Maintenance personnel may be required to inspect the facility once each day to perform routine work such as lubrication, removal of trash from the barriers, adjustments to the control gates, etc. As stated earlier, standby or backup power supply will not be necessary because of the STA’s ability to accommodate short to moderate duration down periods without damage to the facility. The pumps will discharge to a 30-inch force main that will convey 7,050 feet to the outlet header at the upstream end of the treatment system.

The STA will be bounded on all sides by low levees, along with a separation levee across the mid-section of the site to separate Cells 1 and 2. The total length of levees is approximately 32,100 feet. The average height of all levees is about 6.1 feet. In the southwest corner, larger levees are needed because of an existing low spot in the topography. The levee crest will be wide enough to allow access by maintenance vehicles. The side slopes will be approximately 1V to 3H. The outside face of the levee will be seeded for erosion protection. The levee will be constructed from onsite materials. They are designed to operate for conditions up to the 10-year 24-hour precipitation event and/or the 10-year flood on Nubbin Slough. Safety valves will be provided at two locations in the levee adjacent to the Slough as well as in the separation levee for precipitation events greater than the 8 inches of the 10-year 24-hour storm. Six deep zone trenches will cross the treatment cells from north to south, three for each cell. The total length of deep zone trenches is 21,500 feet. The trenches will serve as uniform flow distribution or collection devices across the treatment cells. They are necessary to mitigate against flow short-circuiting because of site topography and other physical features, or at point sources or sinks of flows such as the force main outfall, the separation levee gates and the outlet gate structures. The trenches will be approximately 3 feet below the adjacent natural grade with a base width of 50 feet and side slopes of 4H to 1V.

Local runoff incident to the project area will be collected in a swale/ditch immediately adjacent to the outside face of the east and south perimeter levees. The ditch will convey flow to the

nearest watercourse. There will be no major grading within the cells beyond that required for construction of the levees and deep zone trenches. Topsoil will be removed from the areas under the footprint of all levees and from trench and other excavation zones. The soil will be used for plugs to existing channels and depressions throughout the site, specifically the larger existing channels associated with the spray field. The plugs will be placed at approximately 150-foot intervals, depending upon available material. The cells will not be planted since a seed source exists for native vegetation. Initial preparation of the site and water level management will encourage natural plant recruitment. After levees are constructed, the ground surface will be prepared to allow optimum conditions for native recruitment. Three control gates will be located in the separation levee between cell 1 and cell 2 and three gates in the west perimeter levee will be constructed to allow for control of flow between the cells and back to Nubbin Slough, respectively. The gates will be manually operated. Daily adjustments could be made at the same time as daily maintenance at the pump stations. The gates will have instrumentation to collect water quality, water level, and flow rate data.

Access roads within the property will be eliminated and access will be provided on the gravel-surfaced crests of the perimeter levees. Existing buildings within the footprint of the project will be demolished along with existing structures. A significant portion of the treatment area lies within the Dairy's center point spray field, with tile field beneath. This drainage feature will no longer exist after construction due to the construction of separation levees immediately downstream of the tile field's perimeter collection ditches. This levee will isolate the entire spray-field drainage system and will plug the outflow channel at its crossing point. Fill plugs will be placed across the ditch section at periodic intervals to prevent flow short circuiting in the existing perimeter collection ditch after it becomes submerged.

With the entire 1,100 acres of area south of the main and east branches of Nubbin Slough used for treatment, the estimated mass of phosphorus removal is 22,600 lb/yr, assuming a uniform influent concentration of 620 ppb and neglecting the water balance effects of precipitation, evapotranspiration, etc. The resulting flow weighted effluent concentration is 62 ppb.

This preferred alternative provides a feasible phosphorus removal cost rate, which meets project goals. If future funds become available, this alternative provides the flexibility to add elements of N-4, which would increase the phosphorus removal rate. Alternative N-5 consists of one large treatment area split to provide greater efficiency in the treatment of phosphorus. This alternative provides flexibility in operation and uses the existing topography to function. In addition, this alternative takes advantage of the full site, does not require extensive excavation, and provides water storage. The preferred alternative will provide immediate benefits, is compatible with the proposed plan presented in the Central and Southern Florida Project Comprehensive Review Study, and is within the budgetary constraints of the WRDA-96 critical restoration project program.

2.3 Alternatives for Grassy Island/Taylor Creek Site. Alternatives will be referred to as they are identified in the Contractor's report, T-1 through T-5. All alternatives consider different design elements for the STA. For all alternatives, planting will not be a feature of the project, since a seed source exists for historical vegetation. The outer face of the levees will be seeded for erosion control. Alternative T-1 includes elements that will also be incorporated into the other alternatives, but they are only mentioned in detail within Alternative T-1.

2.3.1 Alternative T-1**.** The Taylor Creek STA site would be bounded by a levee which will be an average 6.5 feet high. The levee will serve the purpose of containing the treatment process flow

and will also exclude the flood flows up to at least the 50-year event with about 3 feet of freeboard and without overtopping by the 100-year event. The levee crest would be approximately 11.5 feet wide to allow access by maintenance vehicles. This levee would be constructed using in situ soils, if they are adequate for stable levee construction. The inside face of the levee would then be sealed with bentonite. The side slopes of the levee would be an estimated 1V to 3H. Water would be pumped directly from Taylor Creek at the upstream end of the site. The pump station would consist of four submersible pumps, three operating at an approximate 18-foot total head and the fourth on standby. The pumps would then discharge to a distribution header channel incorporated into the north segment of the perimeter levee. The channel would be concrete lined with a wetted sectional area and a flow velocity of approximately 3 fps. The header channel would then supply flow to distribution structures located at 150-foot intervals along its length. These structures would be small box weirs mounted into the levee crest section. The un-gated weirs were selected because of their ease of maintenance and the cost. The box weirs would be 1 foot wide. The weirs will be set and positioned so as to create even flow distribution across the site. The distribution structures would then discharge into a series of three STA cells.

The STA cells would be separated using the outer bounds of the perimeter levees and the construction of interior separation levees. The cell separation levees will be used to regulate flow through the cell by controlling water depth, discharge rate and flow distribution. The separation levees will be approximately 4 feet high with an 11.5 crest width and 1V to 3H side slopes. They will be aligned perpendicular to the primary direction of flow. More distribution structures will be inset into the separation levees to distribute flow as discussed above. The separation levee/box weir combinations will be configured to provide a maximum water depth of 2 feet at the upstream face of the separation levee under design flow conditions. Spacing will be determined by looking at topography and design functions. Flow would continue into the remaining cells. The three cells will help to maintain a spread of the flow across the width of the site and will inhibit flow short-circuiting. Control structures would also be located in each of the separation levees and in the southern end of the main perimeter levee adjacent to Taylor Creek to provide a means to drain the cells for major maintenance purposes.

There should be no grading necessary beyond that required for construction of the levees. Borrow for the levees would be from lands adjacent to the structure and for the separation levees, immediately upstream from the levee being constructed. The channels formed in these borrow areas upstream of the separation will further facilitate the redistribution of flow throughout the system. Discharge will be from cell 3 through a "morning glory" type outfall structure at the upstream end to control the pool depth in Cell 3. Two of the discharge structures will outlet flows to Taylor Creek while the third discharges to the channel through the box culvert under U.S. Route 441 about 1,000 feet north of the highway bridge over Taylor Creek. This third outlet will provide low flow to the area east of the highway. The levee/drainage swale/culvert arrangement of Cell 3 is designed for the protection of the cypress stand, with a levee surrounding the stand to exclude it from the cell. Local runoff from the adjacent property immediately east of the project area will be collected in a swale/ditch immediately adjacent to the outside face of the perimeter levee. This ditch will convey flow either north to Taylor Creek immediately upstream from the proposed pump station, or south and east to the existing drainage way adjacent to U.S. Route 441. The existing drainage way routes flow through the culvert located about 1,000 feet north of the highway bridge over Taylor Creek.

2.3.2 Alternative T-2**.** Alternative T-2 differs from Alternative T-1 in the proposed system of flow delivery to the treatment cells. For this alternative, the existing S-1 control gate on Taylor Creek

upstream from the U.S. Route 441 bridge would be rehabilitated and used to surcharge the upstream pool of Taylor Creek. With this raised stream water surface, flow would enter the upper reach of the treatment area by gravity by inflow control gates breaching the perimeter levee adjacent to the creek. Treated water would discharge from the project area through outlet structures positioned downstream from the rehabilitated S-1 structure. Other features described for Alternative T-1 would also apply for Alternative T-2 including the boundary levees, flow distribution structures, separation levees, draw down structures, grading, outlet structures, cypress tree isolation, and perimeter drainage. This alternative was determined to be infeasible because of back flooding that routes flow to the treatment cells also floods agricultural property west of Taylor Creek and has the potential to flood upstream from the site.

2.3.3 Alternative T-3**.** Alternative T-3 is identical to Alternative T-1 except for the configuration of the treatment cells. Alternative T-3 features a buffer/sedimentation cell at the upstream end of the site, followed by a single treatment cell that snakes its way south by means of a series of finger dikes. The finger dikes would project from alternate sides so as to distribute flow over the surface area without the need for structures. The pump station would discharge directly into the buffer/sedimentation cell at the upstream end of the treatment cells. The buffer cell would be excavated to a depth of approximately 3 feet below existing grade. As with the other alternatives, if suitable, the excavated material will be used to construct the main perimeter levee. The flow then continues by a separation levee/distribution structure arrangement as with the other alternatives. A single treatment cell would be located between the buffer cell and the lower cell (surrounding the tree stand). This primary cell would be broken up by a series of paralleled finger dikes set at 500 foot intervals, extending alternately from the east and west perimeter levee leaving a 80 foot opening at their head end. The finger dikes would inhibit flow short-circuiting while minimizing the number of distribution and other structures within the cell and their associated maintenance requirements.

2.3.4 Alternative T-4**.** This alternative is also essentially identical to Alternative T-1, except for the configuration of the treatment cells. Alternative T-4 features a buffer/sedimentation cell, as in Alternative T-3, however Alternative T-4 includes a series of treatment cells that cascade south to the outlets. This alternative also includes a central dividing separation levee, which separates the treatment cells into two parallel trains. The purpose of the central dividing separation levee is to provide flexibility in operation of the project. One train of the treatment process can be taken out of service for major maintenance or other reasons while the second continues in operation. Deep zone trenches would also be included. These trenches would be located across the width of the treatment cells at about the midpoint between the separation levees. They would be used to collect and redistribute flow and retard short-circuiting. The trenches would have a 10-foot bottom.

2.3.5 Alternative T-5/Preferred Alternative**.** In previous alternatives, a feature was included to provide for the protection of the cypress stand on the property. This feature was a levee/drainage swale/culvert arrangement that would be used to aid in regulating water levels since it was thought that the cypress trees would not be tolerant to variable water levels that submerge the knees of their root system for prolonged periods. Further evaluation and coordination with resource agencies concluded that this separate feature was not necessary, since the trees are tolerant to the proposed STA treatment and flooding scheme if long term inundation is less than 2 feet. Other than this feature, this alternative would be identical to Alternative T-4.

Influent water for the treatment process would be pumped at a constant 2,850 gpm rate directly from Taylor Creek at the upstream end of the project site. The pump station would feature four submersible pumps, three operating at an 18-foot total head with the fourth pump on standby. During dry periods, the fourth pump may also be run to supplement flow lost to evapotranspiration and seepage. The intake for the pump station will be set into the bank of Taylor Creek. The depth of flow in Taylor Creek is adequate to sustain diversion at all times, including projected low flow periods. The culvert headwall will incorporate provisions for stop log slots to isolate the pump station during major maintenance events, and a floating trash barrier. The pumps discharge to Cell 1 by short segment of 14 inch force main which outlets to a deep zone trench at the upstream end of the cell and forms the distribution header channel for the overland flow of the system. As with the New Palm site, the station will be unmanned and remotely operated with maintenance personnel inspection once each day. There will be no standby or backup power supply to the pumping station because STA's can readily accommodate short to moderate duration down periods without damage to the facility. The outlet to the force main will consist of a culvert type headwall section.

The site would be bounded on all sides by low levees with a single short separation levee across the mid-section of the site to provide separation between Cells 1 and 2. The total length of levees would be 17,580 feet. The design pool level for Cells 1 and 2 is 24.6 feet and 23.6 feet, respectively. The free board allowance for both cells is 3 feet, which consists of 8 inches for the 10-year 24-hour storm, an estimated 4 inches surge, 1.5 feet for wave runup, and 4 inches for backwater effects. The average levee height would be approximately 3 feet with side slopes of 1V to 3H. The levees would be constructed from onsite materials. Armored low crest overflow sections (safety valves) would be placed in the levee adjacent to Taylor Creek at one location for each cell for precipitation events greater than the 8 inches of the 10-year 24-hour storm. Seven deep zone trenches cross the treatment cells from west to east, four for Cell 1 and three for Cell 2. Cell 1 has a header, two intermediate and a collector trench at the separation levee. Cell 2 has a header at the separation levee and two intermediate trenches. The trenches serve as uniform flow distribution or collection devices across the treatment cells which mitigate against flow short-circuiting because of site topography and other physical features, or at point sources or sinks of flows such as the force main outfall, the separation levee gate and the outlet structure. The deep zones will also provide a source of levee fill material. The trenches will be cut at about 3 feet below the adjacent natural grade, will have a base width of 50 feet, and side slopes of 4H to 1V.

As stated earlier, local runoff from the property immediately east of the project will be collected in a swale/ditch immediately adjacent to the outside face of the east and north perimeter levees. This ditch will convey flow tributary to the north perimeter levee and the 600 feet north segment of the east levee to the north and to Taylor Creek. Local runoff tributary to the remainder of the east perimeter levee will be routed south to the existing box culvert under U.S. Route 441 located approximately 1,000 feet north of the highway's bridge over Taylor Creek. There will be no major grading within the cells beyond that required for construction of the levees and deep zone trenches. The primary borrow source for the levees are the deep zone trench cuts. Supplementary borrow for the levees should be from lands inside the cells adjacent to the perimeter levee structure and for the separation levees, immediately upstream from the levee being constructed. The depth of supplementary excavation will be limited so that the maximum depth of water in the cell does not exceed 2 feet for the design flow condition. Topsoil will be removed from the areas under the footprint of all levees and from trench and other excavation zones. This topsoil is assumed to have no structural value and will be disposed of as fill for existing channels and depressions throughout the site. The natural streambed for Taylor Creek or its tributaries winds through much of the site creating a shallow broad v-shaped channel.

These channels are typically 1.5 to 2.5 feet and will be filled with compacted topsoil to about the elevation of their bands to inhibit the process of flow short-circuiting in deeper water aligned parallel to the direction of flow. Only the exposed faces of the levees and drainage ditches will be seeded for erosion protection. As with the New Palm site, historical vegetation is expected to propagate once the site is prepared and optimum conditions are reached.

Three gates control flow from Cell1 to Cell 2 and outflow from Cell 2. One control gate is located in the separation levee and the two other gates are located in the perimeter levee. One gate in the perimeter levee is located at the south end of the site returning flow directly to Taylor Creek and the second discharging flow to the box culvert under U.S. Route 441 (north of the Taylor Creek bridge). A floating trash boom is provided in the trench or pool immediately upstream of each of the gates to inhibit light floating vegetation from entering the gate and associated culvert system. The concrete box structure associated with the gates route flow to culverts through the levees. The culverts then discharge to a T-pipe section which distributes flow in two directions in the upstream deep trench for Cell 2 or directly into a riprap lined channel for the outlet structures. Although manually operated, the gates will have instrumentation that monitors water quality, water levels, and rate of flow.

The preferred alternative provides the necessary benefits to reach project goals with more simplicity in design than other alternatives. This alternative does not threaten back flooding or flooding upstream from the site. In addition, this alternative provides the flexibility of a series of treatment cells, without removing the cypress trees from the project. Deep zone trenches are included to collect and redistribute flow and retard short-circuiting. The preferred alternative will provide immediate benefits, is compatible with the proposed plan presented in the Central and Southern Florida Project Comprehensive Review Study, and is within the budgetary constraints of the WRDA-96 critical restoration project program.

3.0 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action.

3.1 General Environmental Setting. The New Palm site is located near the northeastern shore of Lake Okeechobee and at the base of Nubbin Slough, and primarily consists of large areas of improved pasture and hayfields of the New Palm Dairy operation. The New Palm Dairy is an active dairy operation, comprised of the centrally located dairy barns, equipment houses, high intensity areas, waste storage areas and lagoon, surrounded by pastures and hayfields. The old Newcomer dairy barn and houses remain in the southwest quadrant of the property, although they are not in operation.

The Grassy Island property is a small part of a beef cattle ranch known as the Grassy Island Ranch. The parcel was improved pasture in the past but has had no improvements, by way of chemical fertilizing, in several years. The pasture has thus reverted back to a more unimproved state. The area is still used for grazing.

3.2 Biological Environment.

3.2.1 Vegetation. Nubbin Slough consists of riparian swamps and oak hammocks which traverse the northern and central portions of the property. Small, isolated freshwater-emergent marshes are scattered throughout most of the site as well as on the surrounding lands. A small band of wet prairie is present near the southeast corner. The central 32-acre waste storage lagoon is also a notable feature, and is indicated as freshwater-open wetland on the National Wetlands Inventory. Landuse/Land cover classification within the site is agriculture (improved pasture, dairies, reservoirs) with some wetlands (stream & lake swamps, wet prairies and freshwater marshes).

The Grassy Island parcel was previously part of the Taylor Creek floodplain and remnants of the former wetlands remain. This site and most of the surrounding land is agricultural (improved pasture) with forested wetland areas associated with the Taylor Creek system. The northern 100 acres include depressional areas reminiscent of the previous floodplain. The southern 90 acres is pasture with Cypress swamps inhabiting the low areas. The pasture is predominately bahia grass with some interspersed smut grass and patches of sabal palms and palmettos. Brazilian pepper (an exotic) and wax myrtle (a nuisance species) are encroaching the periphery of the cypress heads and along the banks of Taylor Creek. The Florida Natural Areas Inventory (FNAI) designates the very southern end of the property as an area of conservation interest, in connection with the larger forested wetlands system to the slough along Taylor Creek.

3.2.2 Threatened and Endangered Species. Federally listed species which may occur in the vicinity of the entire project area (both sites) are: endangered wood stork (*Mycteria americana*) and Okeechobee gourd (*Cucurbita okeechobeensis*), and the threatened Bald eagle (*Haliaeetus leucocephalus*), Audubons's crested caracara (*Polyborus plancus audubonii*), and eastern indigo snake (*Drymarchon corais couperi*). State listed Species of Special Concern which may occur in the project area and are not listed above include: american alligator (*Alligator mississippiensis*), gopher frog (*Rana capito*), gopher tortoise (*Gopherus polyphemus*), roseate spoonbill (*Ajaia ajaja*), limpkin (*Aramus guarauna*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), white ibis (*Eudocimus alba*), burrowing owl (*Speotyto cunicularia*), Sherman's fox squirrel (*Sciurus niger shermani*), and the threatened southeastern american kestrel (*Falco sparverius paulus*), and Florida sandhill crane (*Grus canadensis paratensis*).

3.2.3 Fish and Wildlife Resources. Currently at the Taylor Creek Site, habitat is fragmented between the large areas of pasture for cattle grazing, upland forested areas, Cypress stand, depressional areas, forested wetlands, etc. The Florida Natural Areas Inventory (FNAI) designates the very southern end of the property as an area of conservation interest, in connection with the larger forested wetlands system to the slough along Taylor Creek.

Nubbin Slough provides very similar habitat to that of Taylor Creek. The site consists largely of improved pasture and hayfields of the New Palm Dairy operation. Riparian swamps and oak hammocks associated with Nubbin Slough, transverse the northern and central portions of the property. Small, isolated freshwater-emergent marshes are scattered throughout most of the site as well as on the surrounding lands. A small band of wet prairie is present near the southeast corner. The central 32-acre waste storage pond is also a notable feature, and is indicated as freshwater-open wetland on the National Wetlands Inventory. There are areas of freshwater marshes and wet prairies throughout the landscape. The combined wetlands comprise approximately 15 to 20 percent of the property. The bulk of the remaining land is

improved pasture and spray field, with dairy barns and associated lagoons. Although wading bird habitat exists, populations are relatively sparse compared to historical numbers due to the loss of wetland habitat. Restoration of wetlands on this site would restore some of this habitat.

According to the U.S. Fish and Wildlife Service (USFWS) in their Coordination Act Report, the open pastures with scattered cabbage palms at both sites are prime feeding and nesting habitat for the Audubon's crested caracara. The caracara was observed in the USFWS's site visit at both sites. The open pasture is also frequent habitat for the turkey vulture, sandhill cranes, meadowlarks, mourning doves, and white-eyed vireos. With the variety of habitat comes a variety of species use. Gopher tortoise burrows were found on the USFWS's site visit on the mound between Nubbin Slough and the remnant floodplain swamp adjacent to the New Palm project site. They, as well as indigo snakes, would be expected to also inhabit the Taylor Creek Site. According to the USFWS the wooded areas (wetland and upland) provide habitat for migratory, as well as resident birds. The upland forests and floodplain swamps provide habitat for various mammals such as opossum, gray fox, armadillo, gray squirrel, eastern cottontail, marsh rabbit, raccoon bobcat, white-tailed deer, and feral hog. The marsh provides habitat for a variety of frogs and snakes, as well as a variety of wading birds, such as the wood stork. The marsh also provides feeding habitat for birds of prey, such as the bald eagle and crested caracara, and the depressional marshes are prime habitat for the Florida duck. Both sites also contain ponds, which provide opportune habitat for a wide expanse of wading birds, as well as reptiles and amphibians. Detailed habitat and species information can be found in the USFWS CAR in Appendix D.

3.3 Physical Environment.

3.3.1 Coastal Barrier Resources. These areas are not located within limits of Coastal Barrier Resource System Units.

3.3.2 Water Quality. Presently, the water quality in Nubbin Slough is very poor due to high nutrient loading primarily from dairy operations. The average phosphorus concentration in Nubbin Slough is approximately 620 ppb. This concentration greatly exceeds the average phosphorus concentration in Lake Okeechobee.

The water quality in Taylor Creek is degraded due to high nutrient loading from agricultural runoff. The average phosphorus concentration in Taylor Creek runoff is approximately 600 parts per billion (ppb). This greatly exceeds the phosphorus concentration of the receiving water (Lake Okeechobee) which averages 100 ppb.

3.3.3 Hazardous, Toxic and Radioactive Waste. The preliminary assessment indicated no evidence of hazardous, toxic or radioactive waste (HTRW) on the project lands. During land procurement and project construction further HTRW awareness should be practiced.

A large portion of the property considered for this project, is or was agricultural land. Agricultural activities are exempt from Resource Conservation Recovery Act (RCRA) as section 40 CFR 261.4 (b)(2)(ii) provides an exclusion. Therefore, the handling, storage and reporting requirements established by RCRA are not applicable. Farm chemical storage and mixing sites are regulated by Federal Insecticide, Fungicide and Rodenticide ACT (FIFRA). The chemicals typically used by farmers are pesticides, fuels and herbicides. Spills or problems associated with farm spill sites are not documented or the HTRW database search conducted during this assessment did not reveal their existence.

3.3.4 Air Quality. The project is in compliance with ambient air standards.

3.3.5 Noise. Ambient noise levels in the project area are low to moderate. The major noise producing sources in the immediate area of both sites are associated with agricultural, residential, and other human activity.

3.4 Cultural, Historic, and Archeological Resources. The Corps is coordinating this project with the State Historic Preservation Officer. The Corps conducted a site visit and determined that no properties listed or eligible for listing on the National Register of Historic Places will be affected by the project. The Corps will seek concurrence from the State Historic Preservation Officer. Project construction will not commence until coordination with the SHPO is complete.

3.5 Socio-Economic Environment.

3.5.1 Aesthetic Resources. This site and most of the surrounding land is agricultural (improved pasture) with forested wetlands areas associated with the Taylor Creek system. To the east of 441 is the Florida School for Boys. There are also small residential areas.

The New Palm Dairy is an active dairy operation, comprised of the centrally located dairy barns, equipment houses, high intensity areas, waste storage areas and lagoon, surrounded by pastures and hayfields. Landuse/Land cover classification within the site is agriculture (improved pasture, dairies, reservoirs) with some wetlands (stream & lake swamps, wet prairies and freshwater marshes). The dairy houses comprise a small strip of fixed single family units near the southernmost point of the property. Surrounding landuse/landcover is classified as agriculture/rangeland with wetlands, and upland forests (source: FLUCCS - Florida Land Use & Land Cover Classification System, 1995). Future land use is designated as agriculture.

3.5.2 Recreation Resources. There are no major recreational establishments within the immediate area of these projects. These are primarily agricultural areas. However, some adjacent areas are used for fishing and hunting.

4.0 ENVIRONMENTAL EFFECTS

The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 General Environmental Effect. The overall goal for the project is to improve water quality of waters entering Lake Okeechobee. This project will reduce the phosphorus levels of water entering the Lake, as well as provide more suitable habitat for various fish and wildlife on site.

4.2 Biological Resources.

4.2.1 Vegetation. The Grassy Island/Taylor Creek site consists of pasture with predominately bahia grass and interspersed smut grass and patches of sabal palms and palmettos. Brazilian pepper (an exotic) and wax myrtle (a nuisance species) are encroaching the periphery of the cypress heads and along the banks of Taylor Creek. The northern 100 acres include depressional areas reminiscent of the previous floodplain. The southern 90 acres is pasture with Cypress swamps inhabiting the low areas. This site and most of the surrounding land is agricultural (improved pasture) with forested wetlands areas associated with the Taylor Creek system.

The Nubbin Slough/New Palm site consists of large areas of improved pasture and hayfields of the New Palm Dairy operation. Riparian swamps and oak hammocks associated with Nubbin Slough, transverse the northern and central portions of the property. Small, isolated freshwater-emergent marshes are scattered throughout most of the site as well as on the surrounding lands. A small band of wet prairie is present near the southeast corner.

4.2.1.1 No Action. If none of the alternatives suggested is chosen, the system would continue on its present course, namely with high phosphorus levels. This would only encourage further development of exotics or less desirable vegetation and would not aid in the restoration of habitat.

4.2.1.2 Alternatives N-1 to N-4, T-1 to T-4. Since all alternatives would involve the construction of an STA, effects to vegetation would be the same. Creating the STA's and introducing water to these areas is expected to encourage the restoration of habitat for vegetation by encouraging the existing seed source to repopulate. Once these areas are wet, the existing vegetation may not survive, however it is anticipated that more desirable vegetation will populate.

4.2.1.3 Nubbin Slough/New Palm Site Preferred Alternative N-5. As stated above, creation of the STA is expected to encourage the recruitment of native vegetation in the area. The site will be created into a treatment wetland, therefore, wetland plant species are expected to populate and thrive. Vegetation surrounding and within the lagoon will remain and continue to provide forage and resting habitat for birds, reptiles, and invertebrates. As with Alternative N-3, upland vegetation on the northern end of the project site will remain and continue to provide habitat to wildlife that currently use the site.

4.2.1.4 Taylor Creek/Grassy Island Site Preferred Alternative T-5. The creation of the STA is expected to provide wetland habitat suitable for the recruitment of historical vegetation. This will create habitat for various fish and wildlife. In addition, this alternative provides the benefit of keeping the cypress trees within the project. By allowing the cypress trees to remain in the project, they will receive water not exceeding 2 feet, which is more appropriate habitat for the trees. If levees were constructed to isolate the trees, the trees would not receive the flow provided by the STA.

4.2.2 Threatened and Endangered Species.

4.2.2.1 No Action. If no action is taken, the current use of the New Palm and Grassy Island sites will continue with no habitat restoration. The levels of phosphorus in Lake Okeechobee would be expected to remain at existing levels or rise, which could increase undesirable vegetation in the area and decrease viable habitat for wildlife. Specifically, if water quality remains as it is or is degraded further, available habitat for Federally listed species such as wood storks, eastern indigo snakes, Florida panthers, and snail kites, as well as habitat for the state listed least tern, will decline.

4.2.2.2 Alternatives N-1 to N-4, T-1 to T-4. As previously stated, all alternatives for these sites consists of the construction of STAs. Water quality entering Lake Okeechobee would be expected to improve with the construction of these STAs. In addition, benefits would be realized through water storage and retention. With the benefit of water storage and retention comes the benefit of reduction of releases to the Lake when there are heavy rainfall periods resulting in the lake stage rising and an increase in release during periods of drought. These alternatives are expected to provide the project benefits required meeting the goals of the project, improvement

of water quality to waters entering Lake Okeechobee, as well as water storage and retention of those waters. Improvement of water quality and water retention will improve habitat within and around Lake Okeechobee, which is used by snail kites, indigo snakes, wood storks, and Florida panthers.

4.2.2.3 Nubbin Slough/New Palm Site Preferred Alternative N-5. Although a small portion of the watershed, the improved water quality and timing of water to Lake Okeechobee is expected to improve some habitat within and around the lake. The lake provides habitat for many threatened and endangered species. Therefore, improvement to a portion of lake habitat is an improvement to habitat for these species including snail kites, wood storks, and indigo snakes. On-site, allowing a portion of the project to remain dry may continue to provide habitat to caracara in the area. The Corps will include the Standard Construction Precautions for the Eastern Indigo Snake and the Terms and Conditions in the USFWS biological opinion for the caracara in the contract plans and specifications in the project. These measures are expected to minimize impacts to these species.

4.2.2.4 Taylor Creek/Grassy Island Site Preferred Alternative T-5. Improvements to portions of habitat within and around the lake will allow better conditions for the threatened and endangered species that use that habitat, including snail kites, wood storks, and indigo snakes. The Corps will include the Standard Construction Precautions for the Eastern Indigo Snake and the Terms and Conditions in the USFWS biological opinion for the caracara in the contract plans and specifications in the project. These measures are expected to minimize impacts to these species.

4.2.2.5 Section 7 Coordination. The USFWS submitted a biological opinion, in accordance with Section 7 of the Endangered Species Act on April 28, 1999 assessing the effects of the proposed project, including the 10 permitted sited mentioned previously, on the Audubon's crested caracara (Appendix C). Also considered during the Section 7 consultation process were the snail kite, wood stork, bald eagle, eastern indigo snake, and the Okeechobee gourd. The Corps agreed to include the Standard Construction Precautions for the Eastern Indigo Snake in the plans and specifications for the project (Appendix F). For the other listed species, except for the caracara, the USFWS determined that the project will not directly impact those species and would indirectly benefit the habitat conditions for those species. The incidental take statement lists conditions to be included as part of the project to minimize impact to the caracara (Appendix C).

4.2.3 Fish and Wildlife Resources. In addition to Federal and State listed threatened and endangered species, other fish and wildlife would be expected to benefit from this restoration project. In the CAR, the USFWS lists a number of species listed by the State of Florida Game and Freshwater Fish Commission as Species of Special Concern. These species, as well as other fish and wildlife that use the project area for foraging, nesting, and resting habitat are addressed in the CAR (Appendix D).

4.2.3.1 No Action. As stated in the previous sections of this element, if no action is taken, water quality degradation in the Lake Okeechobee region would be expected to continue. As water quality decreases, the health of the water in the Lake region would decrease and the type of vegetation would shift to less desirable vegetation, such as exotics and opportunistic species. The degradation of habitat would ultimately contribute to the decline of species of fish and wildlife.

4.2.3.2 Alternatives N-1 to N-4, T-1 to T-4. The STAs are expected to provide water quality and retention benefits to the area, which would be an improvement in habitat for fish and wildlife. The proposed STAs would provide benefits to fish and wildlife habitat, which would, in turn, provide more benefits to fish and wildlife in the area. The proposed alternatives meet the goals of the project and would be expected to improve habitat for fish and wildlife within the Lake Okeechobee region and within the project sites.

4.2.3.3 Nubbin Slough/New Palm Site Preferred Alternative N-5. On-site benefits to fish and wildlife will be the creation of wetland habitat. Benefits that may be realized downstream of the site would be the improvements to water quality and to a lesser extent, through groundwater recharge and attenuation of peak flows to Lake Okeechobee. The extreme high and low water stages have proved to be a major habitat concern to the ecology of the lake, therefore, the water releases to the lake to aid in the prevention of these highs and lows would be beneficial to wildlife utilizing the area.

4.2.3.4 Taylor Creek/Grassy Island Site Preferred Alternative T-5. As with the Nubbin Slough preferred alternative, the creation of wetland habitat will provide additional habitat for fish and wildlife in the area. The creation of wetland habitat would be expected to provide habitat for reptiles and invertebrates and to a lesser extent, fish, that in turn provide food for birds. In addition, as with the Nubbin Slough preferred alternative, this alternative is expected to add a small component to the regulation of the extreme highs and lows of the lake through water retention.

4.3 Water Quality.

4.3.1 No Action. Currently the Taylor Creek / Nubbin Slough Basin contributes approximately 29 percent of the annual phosphorus load delivered to Lake Okeechobee (Stanley Consultants, 1999). If this project were not constructed, efforts to stabilize and reverse the eutrophication of Lake Okeechobee would be significantly impacted.

If no action is taken, the water quality would continue to degrade and the benefits of phosphorus reduction would not be realized. Without the benefits of water retention and storage, the proportionate benefits to the lake levels will not be realized. With these benefits, a reduction to the rise in lake stages during heavy rainfall periods and a slower drop in lake stages during droughts may be realized.

4.3.2 Alternatives N-1 to N-4, T-1 to T-4. Each of these alternatives would be expected to improve water quality, however, they were eliminated because of other reasons. For example, alternative N-4 actually removes more phosphorus, however its cost is not the most feasible alternative and alternative T-2 could cause back-flooding, making it an undesirable alternative.

4.3.3 Nubbin Slough/New Palm Site Preferred Alternative N-5. For the Nubbin Slough/New Palm site the selected alternative is expected to reduce the phosphorus concentration in the treated water to approximately 20 to 50 ppb. These features meet the objective of the project and therefore would be beneficial to water quality within the area.

4.3.4 Taylor Creek/Grassy Island Site Preferred Alternative T-5. For the Taylor Creek/Grassy Island site the selected alternative is expected to remove 3,127 kg/year (73 tons) of phosphorus from Taylor Creek discharge. The concentration of phosphorus in the treated water is expected to be 70 ppb, which is a reduction of approximately 90 percent from the influent concentration.

These features meet the objective of the project and therefore would be beneficial to water quality within the area.

4.4 Hazardous, Toxic, and Radioactive Waste. The preliminary assessment indicated that no hazardous, toxic, radioactive, or other harmful substances are present within the project area. However, if contaminants are found during property procurement or project construction, the site will be remediated. These chemicals if not detected during the site assessment, may be disturbed or released by increasing the water level and hydroperiod or by removing unnatural structures or features from the landscape. However, our experience has shown that residual HTRW levels when flooded would be difficult to detect because of dispersion and biological activity.

4.5 Air Quality. The short-term impact from emissions by construction equipment associated with the project will not significantly impact air quality.

4.6 Noise. There would be a temporary increase in the noise level during construction. Construction equipment would be properly maintained to minimize the effects of noise. Increases to the current levels of noise as a result of this project would be localized and minor, and limited to the time of construction.

4.7 Cultural, Historic, and Archeological Resources. Based on a site visit and subsequent literature review, the Corps has determined that no historic resources eligible for the National Register of Historic Properties will be affected by this project. This determination is made according to the guidelines established in 36 CFR Part 800 and in compliance with Section 106 of the National Historic Preservation Act. Coordination with the State Historic Preservation Officer (SHPO) is ongoing. Project construction will not commence until coordination with the SHPO is complete.

4.8 Socio-Economic Environment.

4.8.1 Aesthetics Effects. During construction, some noise from the construction equipment may temporarily disturb some adjacent residents in the area. However, this disturbance will be temporary and confined to normal daytime hours. It is expected that breezes will rapidly carry away any engine exhaust fumes. Any temporary decrease in air quality caused by this work will be corrected once work is completed. The negative visual impacts of the equipment will be temporary, and restricted to the period of construction. There will be no lingering air or noise pollution.

4.8.2 Recreation Effects. No long-term effects to recreation will result from implementation of the project. Noise from the heavy equipment would not be expected above the sound of the agricultural equipment currently used on agricultural lands in the area. Visual impacts would be temporary, restricted to the area of construction.

4.9 Energy Requirements and Conservation. The energy requirements for this construction activity would be confined to fuel for construction equipment and labor transportation and the costs and energy required running and maintaining the pump stations.

4.10 Natural or Depletable Resources. The project would provide cleaner water to Lake Okeechobee than is presently being provided. No depletable resources would be used other

than fossil fuels to power equipment and produce materials or equipment needed for construction.

4.11 Cumulative Impacts. Cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). The improvement of water quality, water storage and retention of waters entering Lake Okeechobee would benefit the affected ecosystem. This project combined with other projects being planned for the area would cumulatively provide even greater ecosystem benefits for the area.

4.12 Irreversible and Irretrievable Commitment of Resources.

4.12.1 Irreversible Commitment of Resources. An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. Other than the use of fuel, equipment, and supplies for construction, this project would not result in an irreversible commitment of resources.

4.12.2 Irretrievable Commitment of Resources. An irretrievable commitment of resources is one in which, due to decisions to mandate the resource for another purpose opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. Once the STAs are in operation, there will be disturbance to existing vegetation, however this disturbance will allow historic vegetation to repopulate and reestablish. The lands that will be used for the STAs will not be used for agricultural purposes anymore, but will be restored to historic habitat.

4.13 Unavoidable Adverse Environmental Effects. This project is a restoration project and there are no known unavoidable adverse environmental effects expected.

4.14 Local Short-Term Uses and Maintenance/Enhancement of Long-Term Productivity. The project would involve the utilization of minimal resources. Overall, the project will benefit fish and wildlife and their habitat in the area.

5.0 ENVIRONMENTAL COMMITMENTS

The U.S. Army Corps of Engineers and contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities to Federally threatened and endangered species. The Corps will include the Standard Protection Measures for the Eastern Indigo Snake (Appendix F) and measures to protect the Audubon's crested caracara (reference USFWS BO, Appendix C) in the contract plans and specifications for this project. Measures for the protection of indigo snakes were recommended as a result of coordination with the USFWS since indigo snakes frequently feeds on frogs and snakes found on the edges of wetlands and would likely be found within and around the project area (Moler 1992). Measures for the protection of caracara were recommended as a result of consultation with USFWS since caracara habitat exists on both sites and have been observed at both sites.

6.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

6.1 National Environmental Policy Act of 1969, as amended. Environmental information on the project has been compiled and an Environmental Assessment has been prepared. The project is in compliance with the National Environmental Policy Act.

6.2 Endangered Species Act of 1973, as amended. On March 19, 1999, the Corps initiated formal Section 7 consultation with the USFWS for the Audubon's crested caracara via telephone call with the USFWS. The USFWS submitted a biological opinion (BO) on April 28, 1999 for the effects to caracara from implementation of this project, which also included consultation for the 10 additional sites associated with this project (Appendix C). Conditions made in that BO will be incorporated into this project. As verbally requested by the USFWS and agreed to by the Corps, the standard protection plan for indigo snakes will be included in the plans and specifications for the project.

6.3 Fish and Wildlife Coordination Act of 1958, as amended. This project has been fully coordinated with the USFWS according to the Act. The USFWS submitted a Draft CAR for this project on June 7, 1999. The Draft CAR can be found in Appendix D. Overall, the USFWS supports this project as a step toward remedying the ecological problems of Lake Okeechobee caused by phosphorus loading. The USFWS made recommendations in the CAR as to design considerations. These recommendations will be considered in further project design, during the development of plans and specifications for the project.

6.4 National Historic Preservation Act of 1966, as amended, and the Archeological and Historic Preservation Act, as amended. This project is being coordinated with the State Historic Preservation Office (SHPO). Full compliance will be achieved upon concurrence of no effect by SHPO. Project construction will not commence until coordination with the SHPO is complete.

6.5 Clean Water Act of 1972, as amended. Full compliance will be achieved with issuance of a Section 401 Water Quality Certification from the State. All State water quality standards will be met. A Section 404(b) Evaluation is included in this report as Appendix A.

6.6 Clean Air Act of 1972, as amended. No air quality permits will be required for this project. This document has been prepared according to the Clean Air Act.

6.7 Coastal Zone Management Act of 1972, as amended. A Federal consistency determination in accordance with 15 CFR 930 subpart C is included in this report as Appendix B. State consistency review will be performed during the coordination of the draft EA.

6.8 Farmland Protection Policy Act of 1981. The Corps will consult with the Natural Resources Conservation Service (NRCS) to determine impacts, if any, to prime or unique farmland from implementation of this project. Construction will not commence until coordination with NRCS is complete.

6.9 Wild and Scenic River Act of 1968, as amended. No designated Wild and Scenic river reaches will be affected by project related activities. This act is not applicable.

6.10 Marine Mammal Protection Act of 1972, as amended. No marine mammals would be impacted by this project.

6.11 Estuary Protection Act of 1968. No designated estuary will be affected by project activities. This act is not applicable.

6.12 Federal Water Project Recreation Act, as amended. There is no cost-shared recreation proposed for this project.

6.13 Fishery Conservation and Management Act of 1976. Effects to fisheries will be positive based on water quality improvements to waters returned to Nubbin Slough and Taylor Creek and on to Lake Okeechobee from these STAs.

6.14 Submerged Lands Act of 1953. The project will not occur on submerged lands of the State of Florida. The project will be coordinated with the State during coordination of the draft EA.

6.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990. There are no designated coastal barrier resources in the project area that would be affected by this project.

6.16 Rivers and Harbors Act of 1899. The proposed work will not obstruct navigable waters of the United States. The project is in full compliance.

6.17 Anadromous Fish Conservation Act. Anadromous fish species will not be adversely affected.

6.18 Migratory Bird Treaty Act and Migratory Bird Conservation Act. Migratory birds will not be negatively affected by project activities. The project is in compliance with these acts.

6.19 Marine Protection, Research and Sanctuaries Act. This project does not involve ocean dumping. The Marine Protection, Research and Sanctuaries Act does not apply to this project.

6.19 E.O. 11990, Protection of Wetlands. Wetlands will be restored or enhanced by this project. This project is in compliance with the goals of this Executive Order.

6.20 E.O. 11988, Flood Plain Management. This project will be operated in a manner that would not increase flooding of private property. Therefore this project is in compliance with the goals of this Executive Order.

6.21 E.O. 12898, Environmental Justice. The proposed action would not result in adverse human health or environmental effects. Any impacts of the action would not be disproportionate towards any minority or low-income population. The activity does not (a) exclude persons from participation in, (b) deny persons the benefits of, or (c) subject persons to discrimination because of their race, color, or national origin. The activity would not impact "subsistence consumption of fish and wildlife."

6.22 E.O. 13089, Coral Reef Protection. No coral reef or coral reef organism would be impacted by this project.

7.0 AGENCY COORDINATION

This proposed project is being coordinated with the following agencies: U.S. Fish and Wildlife Service, Florida State Historic Preservation Officer (SHPO), U.S. Environmental Protection Agency, National Marine Fisheries Service, Florida Fish and Wildlife Conservation Commission (formerly Florida Game and Fresh Water Fish Commission), and the Florida Department of Environmental Protection.

8.0 PUBLIC INVOLVEMENT

8.1 Availability of the EA. This Draft EA is being circulated to Federal, State, and Local agencies and a Notice of Availability of the Finding of No Significant Impact is being sent to the interested public for notice and comment.

8.2 Comments Received. Comments on the project will be incorporated into the Final EA and included in the Pertinent Correspondence appendix of the EA (Appendix C).

9.0 LIST OF PREPARERS

This Environmental Assessment was prepared by the following U.S. Army Corps of Engineers, Jacksonville District and South Florida Water Management District personnel:

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APPENDIX EA-A

SECTION 404(b) EVALUATION

Appendix A

SECTION 404(b) EVALUATION

LAKE OKEECHOBEE WATER RETENTION/PHOSPHORUS REMOVAL

CRITICAL PROJECT

OKEECHOBEE COUNTY, FLORIDA

1. Project Description

a. Location. The New Palm Dairy and Newcomer Dairy properties of the New Palm/Nubbin Slough site are located five miles east-southeast of Okeechobee City, east of juncture of SR710 (Beeline Highway) and Nubbin Slough. The Grassy Island/Taylor Creek site is located approximately three miles north of the city of Okeechobee on US 441 lying in the "V" formed by the 441-Taylor Creek intersection. U.S. highway 441 forms the eastern boundary of the site and Taylor Creek forms the western boundary.

b. General Description. The proposed alternative consists of constructing two STAs for the ultimate purpose of improving the quality of water entering Lake Okeechobee.

c. Authority and Purpose. This project is part of the Critical Restoration Projects authorized by Section 528 of the Water Resources Development Act of 1996. The purpose of the project is to improve the quality of water entering Lake Okeechobee and to restore land that was historically wetland.

d. General Description of Dredged or Fill Material.

(1) General Characteristics of Material. For both sites, the fill material will consist of native soils from the site, primarily fine sands and silty sands typical of the southeast Atlantic coastal plain. The levees will be constructed of compacted sand fill obtained from the sites. In addition, the topsoil removed that is unsuitable for levee construction will be used to plug existing channels and depressions through the site. The plugs' purpose is to inhibit the process of flow short-circuiting in deeper water aligned parallel to the direction of flow.

(2) Quantity of Material. For both sites, the proposed STAs are bound on all sides by low levees with a separation levee across the mid-section of the site. For the Taylor Creek site, the total length of levees would be approximately 17,580 feet, with an average height of 3 feet. An approximate 55,000 cubic meters of fill would be excavated and compacted to approximately

46,000 cubic meters for use for the levee. The total length of levees for the Nubbin Slough site would be approximately 32,100 feet with an average height of 6.1 feet. An approximate 240,000 cubic meters of fill would be excavated and compacted to approximately 200,000 cubic meters for use for the levee. The channels that will be plugged with topsoil at Nubbin Slough are typically approximately 12 to 15 feet deep and will be filled with plugs of approximately 20,000 cubic meters of compacted topsoil to about the elevation of their banks. The plugs will be placed at approximately 150-foot intervals, depending upon available topsoil. For Taylor Creek, approximately 21,000 cubic meters of topsoil will be used for fill for channels that are approximately 1.5 to 2.5 feet and will fill to the approximate elevation of their banks, as with Nubbin Slough.

(3) Source of Material. For both sites, the material that is excavated for deep zone trenches and for minor grading on site will be used for levee construction. Topsoil will be removed from the areas under the footprint of all levees and from trench and other excavation zones.

e. Description of the proposed Discharge Site.

(1) Location. Material removed from the area for minor grading and construction of deep zone trenches will be used for levee construction. The levees will surround the sites with an additional levee constructed down the mid-section of the sites for cell separation. The available topsoil will be used as plugs to fill existing channels on the sites. For Nubbin Slough this material will be used for the larger existing channels associated with the spray field. For Taylor Creek this material would be used to fill channels associated with Taylor Creek.

(2) Size. For the Taylor Creek site, the total length of levees would be approximately 17,580 feet, with an average height of 3 feet. The total length of levees for the Nubbin Slough site would be approximately 32,100 feet with an average height of 6.1 feet. For both sites the levee crest will be approximately 15 feet wide to allow access by maintenance vehicles and the side slopes will be 1V to 3H. The channels that will be plugged with topsoil at Nubbin Slough are typically approximately 12 to 15 feet deep and will be filled with plugs of compacted topsoil to about the elevation of their banks. The plugs will be placed at approximately 150-foot intervals, depending upon available topsoil. For Taylor Creek, the topsoil will be used for fill for channels that are approximately 1.5 to 2.5 feet and will fill to the approximate elevation of their banks, as with Nubbin Slough.

(3) Type of Site. All material excavated for the deep zone trenches and graded on the site will be used within the Taylor Creek and Nubbin Slough project sites. Fill will be used in construction of the levees surrounding the sites and for the internal separation levee feature used in both sites proposed alternatives. The area is relatively flat pastureland for both sites with small isolated wetlands located throughout.

(4) Type of Habitat. The Taylor Creek project area consists of pasture with bahia grass with some interspersed smut grass and patches of sabal palms and palmettos. The banks of Taylor Creek are being encroached by exotics, such as Brazilian pepper. The southern portion of the site contains a hardwood-conifer mix of trees. The stand of cypress trees in the south portion of the site will not be effected by fill. The Nubbin Slough project area consists of large areas of improved pasture and hayfields of the New Palm Dairy operation. Riparian swamps and oak hammocks associated with Nubbin Slough traverse the northern and central portions of the property. Small, isolated wetlands are located throughout the site, composing approximately 15 – 20 percent of the site.

(5) Timing and Duration of Discharge. Expected construction duration for Taylor Creek is estimated at 13 months. Expected construction duration for Nubbin Slough is estimated at 18 months. Earthwork is expected to occur throughout construction of the STA's.

f. Description of Disposal Method. All material excavated for the trenches and removed for grading is intended for use in the construction of the levees. Earthwork will take place using a bulldozer. Topsoil removed will be use for plugging existing channels. Slopes for the levees will be stabilized using a 1V to 3H slope.

2. Factual Determination

a. Physical Substrate Determination.

(1) Substrate Elevation and Slope. Existing substrate is fine to silty sands. The existing elevation is relatively flat as is typical of the area. All fill will be obtained onsite from excavation of trenches and grading. Fill will be used to construct levees and topsoil will be used to plug existing channels. For both sites, the Slopes for the levees will be stabilized using a 1V to 3H slope. For the Taylor Creek site, the total length of levees would be approximately 17,580 feet, with an average height of 3 feet. The total length of levees for the Nubbin Slough site would be approximately 32,100 feet with an average height of 6.1 feet. For both sites, trenches will be cut about 3 feet below the adjacent natural grade with a base width of 50 feet. Side slopes will be 4H to 1V. The pumping stations will be constructed adjacent to the water bodies of Taylor Creek and Nubbin Slough and are not expected to need fill to construct them.

(2) Sediment Type. Material removed from the area for minor grading and construction of deep zone trenches will be used for levee construction. For both sites, this material consists of native soils from the site, primarily fine sands and silty sands typical of the southeast Atlantic coastal plain.

(3) Dredge/Fill Material Movement. The fill material will be sloped and stabilized, and should not be subject to erosion. The outside face of the levees will be seeded for erosion protection.

(4) Physical Effects on Benthos. Some benthic organisms will be buried by the fill/construction activities. This will be short-term, as species will readily reestablish.

b. Water Circulation, Fluctuation and Salinity Determination.

(1) Water. Fill placement will have no long-term or significant impacts, if any, on water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients or eutrophication. No effect to salinity would be expected since this is a freshwater, inland site.

(2) Current Patterns and Circulation. During disposal, no effect to current patterns and circulation is expected. With implementation of the project, water from Nubbin Slough and Taylor Creek will be used to implement the project and may decrease water levels in these water bodies. This may have a nominal effect to current patterns and circulation, but is not expected to cause adverse effects and would be expected to stabilize quickly.

(3) Normal Water Level Fluctuations and Salinity Gradients. During disposal, no effect to normal water level fluctuations is expected. With implementation of the project, water from Nubbin Slough and Taylor Creek will be used to implement the project and may decrease water levels

in these water bodies. This small decrease in flow is not expected to cause adverse effects. This project is in a freshwater, inland environment, therefore salinity gradients are not expected to be effected by the project.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. There are no expected changes in suspended particulates and turbidity levels within areas that will be receiving fill. Fill will be excavated from the trench sites and moved to the levee locations, therefore all fill will remain onsite for project construction.

(2) Effects on the Chemical and Physical Properties of the Water Column.

(a) Light Penetration. No adverse effects to light penetration are expected to occur as a result of the project.

(b) Dissolved Oxygen. Dissolved oxygen levels will not be altered significantly by this project.

(c) Toxic Metals, Organics, and Pathogens. No toxic metals, organics, or pathogens will be released by the project.

(d) Aesthetics. Aesthetic quality will be reduced during that period when work is occurring. This will be a temporary effect to the aesthetic quality of the area, limited to the time of construction.

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. There will be no long term effect on primary productivity as a result of the dredging or disposal.

(b) Suspension/Filter Feeders. There will be no long-term adverse impact to suspension/filter feeders.

(c) Sight Feeders. There will be no long-term adverse impact to sight feeders.

d. Contaminant Determinations. Deposited fill material will not introduce, relocate, or increase contaminants.

e. Aquatic Ecosystem and Organism Determinations. No impacts are expected to the aquatic ecosystem from construction of the levees or deep zone trenches.

(1) Endangered and Threatened Species. There will be no impacts on any threatened or endangered species or on critical habitat of any threatened or endangered species. Standard Protection Measures for the Eastern Indigo Snake and measures for the protection of the Audubon’s crested caracara will be a part of the plans and specifications for the project.

(2) Hardbottom Habitat. No hardground or coral reef community would be impacted.

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. The fill material will not cause unacceptable changes in the mixing zone in relation to: depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents.

(2) Determination of Compliance with Applicable Water Quality Standards. Grading and construction of the deep zone trenches, as well as deposition of the resultant material for levee construction will be retained on site. State water quality standards will not be violated.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. No municipal or private water supplies will be impacted by the implementation of the project.

(b) Recreational and Commercial Fisheries. Recreational and commercial fisheries will not be impacted by the disposal of dredged material.

(c) Water Related Recreation. Construction will be localized to the immediate construction area and should have no effect on water related recreation in the area of the STAs. Downstream of the projects, water quality improvements are expected to benefit water related recreation such as fishing.

(d) Aesthetics. The existing environmental setting will not be adversely impacted. Construction activities will cause a temporary increase in noise and air pollution caused by equipment. These impacts are not expected to adversely affect the aesthetic resources over the long term and once construction ends, conditions will return to pre-project levels.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. This project will not have negative effects on any parks, national or historic monuments, national seashores, wilderness areas, research sites, or similar preserves.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. There will be no cumulative impacts that result in a major impairment of water quality of the existing aquatic ecosystem as a result of the placement of fill at the project site.

3. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.

c. The discharge of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The disposal of dredged material will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse

modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

e. The placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

f. On the basis of the guidelines, the proposed disposal site for the discharge of dredged material is specified as complying with the requirements of these guidelines.

APPENDIX EA-B

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM

FEDERAL CONSISTENCY EVALUATION PROCEDURES

Appendix B

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM

FEDERAL CONSISTENCY EVALUATION PROCEDURES

LAKE OKEECHOBEE WATER RETENTION/PHOSPHORUS REMOVAL

CRITICAL PROJECT

OKEECHOBEE COUNTY, FLORIDA

1. Chapter 161, Beach and Shore Preservation.

The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed work does not involve activity on the beach or any coastal shoreline.

2. Chapters 186 and 187, State and Regional Planning.

These chapters establish the State Comprehensive Plan, which sets goals that articulate a strategic vision of the State's future. It's purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project is being coordinated with Federal, State, and Local agencies. The project would provide for ecosystem restoration and improvement of water quality.

3. Chapter 252, Disaster Preparation, Response and Mitigation.

This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The project would have little or no impact on disaster preparation, response or mitigation.

4. Chapter 253, State Lands.

This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The project would provide for ecosystem restoration and associated benefits to Lake Okeechobee.

5. Chapters 253, 259, 260, and 375, Land Acquisition.

This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: Since the affected property is in the process of being aquired by the South Florida Water Management District, this chapter would not apply.

6. Chapter 258, State Parks and Aquatic Preserves.

This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The project would not adversely impact aquatic preserves or state parks near the project area.

7. Chapter 267, Historic Preservation.

This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project is being coordinated with the State Historic Preservation Office (SHPO). Once the SHPO indicates that the project will not adversely affect any known archeological sites, this project will be consistent with the goals of this chapter.

8. Chapter 288, Economic Development and Tourism

This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: This project would not adversely impact beneficial development, economic diversification, or tourism.

9. Chapters 334 and 339, Public Transportation.

This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

10. Chapter 370, Saltwater Living Resources.

This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fisherman and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The project would not adversely impact saltwater living resources. The project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources.

This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions, which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The proposed action will have no adverse effect on freshwater aquatic life or wild animal life. The project is expected to benefit wildlife through improvements in water quality.

12. Chapter 373, Water Resources.

This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project will divert water from the associated water sources of Nubbin Slough and Taylor Creek and return that water in a cleaner state.

13. Chapter 376, Pollutant Spill Prevention and Control.

This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: This project does not involve the transportation or discharging of pollutants.

14. Chapter 377, Oil and Gas Exploration and Production.

This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore does not apply.

15. Chapter 380, Environmental Land and Water Management.

This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development.

Response: The proposed project will not have any regional impact on resources in the area, other than improvement to water quality in Lake Okeechobee and downstream of the project in Nubbin Slough and Taylor Creek. Therefore, the project is consistent with the goals of this chapter.

16. Chapter 388, Arthropod Control.

This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project would not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control.

This chapter authorizes the regulation of pollution of the air and waters of the state by the DEP.

Response: Water Quality Certification will be obtained for the project. An environmental assessment of project impacts has also been prepared and will be reviewed by the appropriate resource agencies including DEP therefore, the project is complying with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation.

This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to project on or near agricultural lands.

Response: The proposed project is not located near or on agricultural lands and therefore, this chapter does not apply.

[Remaining appendices not available on this document]

INDEX

[Use the search/find function of your internet software]

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